NRIS 1410

MONTANA DEPARTMENT OF STATE LANDS

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Preliminary Environmental Review
on
Montana Minerals, Inc.

May 20, 1983

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Introduction

Montana Minerals, Inc. has applied to the Department of State Lands for a new Operating Permit on their placer mining operation. This new Operating Permit will replace Operating Permit #00064. The operation will be conducted in the NE1/4, SW1/4 and NW1/4 of Section 21, T6S, R3W in Madison County. The site is approximately two miles southeast of Virginia City and is located near the mouth of Browns Gulch.

Montana Minerals proposes to permit an additional 1.6 acres in addition to the 21.6 acres already permitted under Operating Permit #00064.

The operations will be conducted on unpatented claims controlled by Montana Minerals. The owner of the surface on which the mining will take place is Cal Creek Ranch of Sheridan, Montana.

Brief History

Placer gold was first discovered in the area May 26, 1863 on Alder Gulch of which Browns Gulch is a triburary. The area was worked almost continually until 1942. Total production for the area is in excess of $100,000,000.

Browns Gulch itself in the past has produced a fairly large amount of gold. For example, in 1899, 5 men worked for 11 days and produced $30,000 in gold. The majority of this gold was in the form of nuggets which averaged between 3-4 ounces each.

Project Operation

Montana Minerals, Inc., proposes to expand their operation to the east, with their proposed new permit. They propose to start at the south end of the operation with their easterly expansion. The proposed operation will involve a total of 23.2 acres and last approximately 2 years.

As previously done under Operating Permit #00064 all available soil materials will be salvaged and stockpiled, prior to mining. Approximately 1 to 5 feet of soil material will be salvaged for reclamation purposes. The soil material will be stockpiled next to the cut from which it came from. After overburden from the succeeding cut is placed in the prior cut the soil material will be placed back and graded. The length of time the soil is stockpiled will be kept at a minimum, probably less then one month. If the soil stockpiles will be subject to wind and water erosion a cover crop of sweet clover will be seeded (at the ratio of 5 lbs PLS/acre) on the stockpiles and a berm will be constructed around the stockpiles.

The overburden and soils total a depth of approximately 30 feet. The pay gravels vary from less then 3 feet to the west to better then 7 feet to the east.

Montana Mineals, Inc. will utilize a "cut and fill" mining technique. As the operation progresses material from each receeding cut will be used to backfill the prior cut. Before backfilling takes place the course washed gravels from the wash plant will be placed at the bottom of the cut to construct a rock drain. A 24 inch culvert will be embedded in the center cut. The rock drain will be used to convey and filter the seepage water.

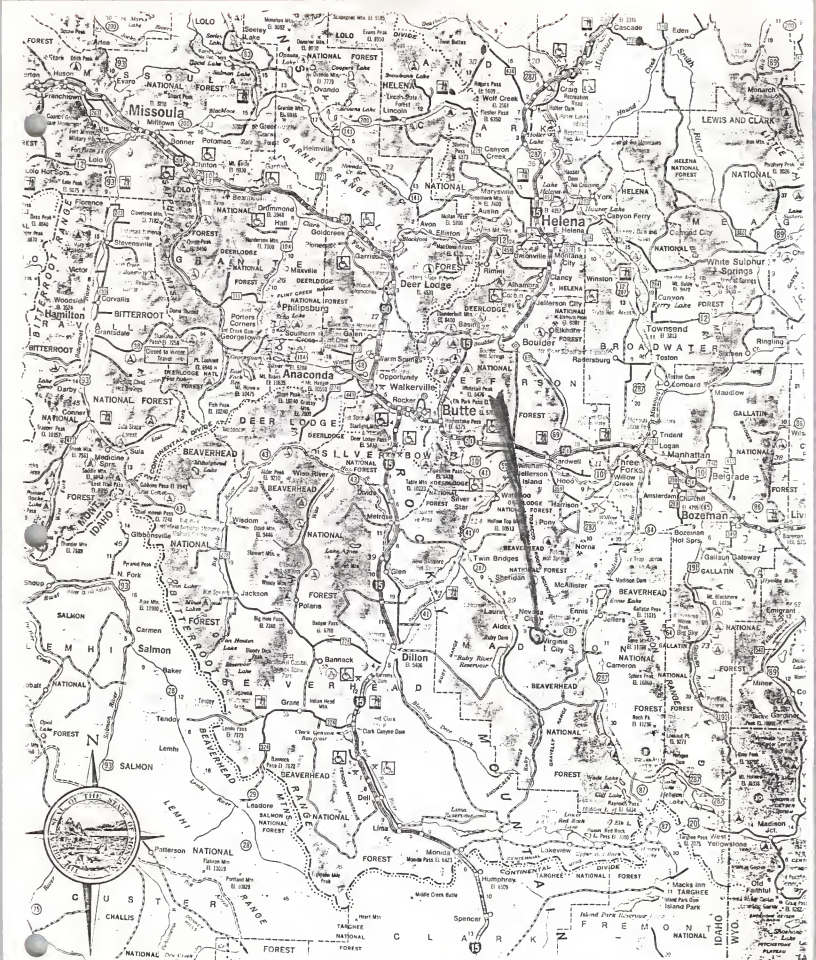
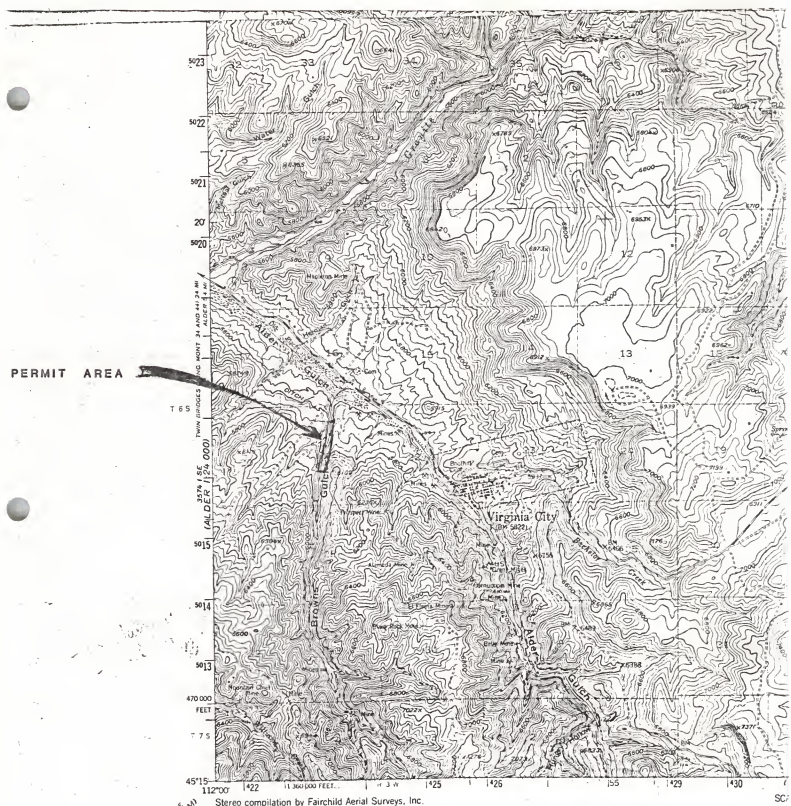


FIGURE 1 GENERAL AREA MAP


PERMIT AREA
Virginia City
(pop. 3422)
Alder Gulch
Granite Mtn.
Fairweather Mine
Brooklyn Mine
Bivens Gulch
Buffalo Gulch
Wisconsin Mine
Ruby Rock Mine
Silver Star Mine
Mammoth Mine
Bivens Mine
Ophir Mine
Ophir Gulch
Ophir Mine Dump
Ophir Mine Shaft
Ophir Mine Tailings
Ophir Mine Tailings Pond
Ophir Mine Tailings Pond Dam
Ophir Mine Tailings Pond Spillway
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After each cut has been backfilled and graded the topsoil will be placed along with fines obtained from the settling ponds. After final grading occurs the stream channel will be reestablished and the area will be seeded.

Reclamation will be concurrent with the mining operations.

Fines obtained from the maintainence of the settling ponds, utilized as subsoil and will be spread on the areas when overburden has been replaced and grated.

Montana Minerals, in the reconstruction of the stream channel, will use their postmining contour map as a guide for compliance with reconstruction standards contained in the Montana Metal Mine Reclamation Act. The topography of the reclaimed area will be approximately the same as prior to mining.

Existing Environment, Impacts and Mitigating Measures

Topography

The mine site lies on the northeastern part of the Gravelly Range in southwestern Montana.

The relief in the area varies from approximately 8,600 feet at the head end of Browns Gulch to about 5,600 feet at the mine site.

The mine site itself is in a fairly narrow gulch. The average gradient of the site is 3.2 percent.

Impacts to the existing topography will be minimal. The grading and contouring of the mine site will blend in with the existing slopes and gulch bottom.

Geology

The geology of the Browns Gulch region is dominated by the pre Beltion Cherry Creek Series. This series consists of quartz-feldspar gneiss, quartz mica schist, crystalline limestone, quartzite and hornblende-biotite schist. The lower Browns Gulch area consists of alluvium approximately 30 feet deep. The placer gravels are from less then 3 feet to greater then 7 feet deep.

Soils

There are substantial amounts of topsoil available for reclamation.

The soil is of the Sharley-Rentsac series. The soil material is from 1 - 5 feet deep. The texture is a sandy loam. (For a complete description see Exhibit 2).

Impact on the soils in the mine area will be minimized by Montana Minerals' commitment to salvage 1 - 5 feet of soil material for reclamation purposes. The soil will be stockpiled next to each cut separately from the overburden and then respread after each cut has been backfilled.

Hydrology

The Browns Gulch Creek normally flows about 3 c.f.s. During the summer months the entire creek is diverted into the McGovern Ditch and used by Cal Creek for

irrigation. During mining and reclamation the entire Creek will be directed around the operation by way of the McGovern Ditch. The McGovern Ditch is being completely relocated by Montana Minerals from above to below the mining operations. The ditch will be capable of holding 10 c.f.s. (See Exhibits 3, 4, 5, and 6).

At the point below the operation the water can be either diverted by a drop structure into Browns Gulch or be conveyed to the fields irrigated by Cal Creek by way of the existing McGovern Ditch.

This drop structure is temporary and consists of a 24 inch culvert with several 45 degree elbows. When the water exits the drop structure at the bottom, the area will be lined with rock to prevent any scouring and sedimentation. This structure is temporary and will be removed in the fall of 1983 upon reclamation of previously disturbed areas not covered by an operation permit, which Montana Minerals has agreed to reclaim as part of their agreement with Cal Creek.

Besides the creek, the area to be mined has a substantial amount of groundwater. The groundwater is the result of a change in gradient of the creek and underground flows from two small tributary gulches of Browns Gulch.

Settling Ponds

The operation will have a total of 4 settling ponds. Three at the upper end of the operation, near the wash plant, and one at the lower end.

The settling ponds at the upper end have already been constructed under Operating Permit 00064. Water from the wash plant flows first into the upper pond for initial settling. It then flows into the middle pond for additional settling and then finally into the lowest pond. From the lowest pond it is recycled to the wash plant. The system is a fairly closed system. Additional make up water needed is obtained from groundwater in the "cuts". The water is pumped from the "cuts" to the lowest pond. Also, there is some natural occurring seepage of groundwater into the ponds.

The settling pond at the lower end is the largest pond. It is designed to handle any groundwater which may remain turbid after going through the rock drain. It is designed with a 24 inch culvert near the top of the dam. It is also equipped with a rock spillway. Below the pond will be a series of silt fences as an added precaution against discharging turbid water into Alder Creek, of which Brown's Gulch is a tributary. Whenever necessary, and at the end of each operating season, the settling pond will be cleaned out. The silt will be placed in a silt containment area west of the settling pond.

As with the upper 3 settling ponds the lower settling pond was approved under Operating Permit 00064.

The upper 3 settling ponds will remain inplace until the operation is completed. At which time they will be reclaimed.

The lower pond will probably be reclaimed in less then a year. It will be reclaimed as soon as the pre-operating permit disturbances are reclaimed.

Montana Minerals has obtained a discharge permit from the Department of Health and Environmental Sciences, Water Quality Bureau.

As these ponds are temporary and will be removed upon completion of the operation their impact is minimal.

Impacts

Impacts to the Browns Gulch system should be minimal. Provisions to control the waste water resulting from the mining operation will be implemented.

Montana Minerals will also take necessary steps to provide Cal Creek the necessary water for irrigation not only by way of the McGovern Ditch, but also through a new 10 foot irrigation pipeline eminating above the area where the McGovern Ditch is diverted.

The groundwater encoutered will be either used in the operation or diverted around the operation by pumping it into the McGovern Ditch.

Vegetation

The expanded operation will impact a total of 23.2 acres along Browns Gulch, part of which has already been disturbed. Willows (Salix spp.), Aspen (Populus tremuloides), Cottonwood (Populus spp.) and Poplar (Populus spp.) make up the overstory. The understory consists of various forbs, shrubs and grasses.

The primary land uses for the permit area are livestock grazing and wildlife habitat.

The impact of the proposed mine will be minimal to the present land uses from a vegetative standpoint. The size of the proposed impact is small in relation to the available surrounding habitat.

Alders, willows, cottonwoods, gooseberry and rosebush seedlings and cuttings will be obtained from the Browns Gulch drainage and planted along the creek banks. All other graded areas will be planted in:

4 lbs/acre	slender wheatgrass	Agropyron trachycaulum
4	streambank wheatgrass	Agropyron riparian
4	thickspike wheatgrass	Agropyron dasystachyum
4	intermediate wheatgrass	Agropyron intermediume
6	green needlegrass	Stipa viridula
4	Russian wildrye	Elymus junceus
4	Kentucky bluegrass	Poa poatensis
4	timothy	Phyleum protense
2	alfalfa	Medicago sativa
36 lbs/acre	90% PLS	

The seeding will be drilled on contour and will be done the first seaonsal opportunity after topsoiling is complete. Fertilizer shall be applied using either manure at the rate of 10-20 tons/acre or 30 lbs. nitrogen and 40 lbs. phosphate/acre.

The area shall be fenced to prevent any livestock or wildlife from grazing on the newly reclaimed site.

If the revegetation does not succeed the first time; the advice of the Soil Conservation Service and the Department of State Lands shall be sought and additional attempts made.

The fence shall not be removed until revegetation is approved by the department. Also at that time the normal creek flow shall be placed back into the reconstructed creek channel.

Air Quality

The Browns Gulch area is a Class II air shed .

The Montana Minerals' placer operation will not have a significant impact on the air quality of the area. The placer mining process is a wet process and dust will be controlled. No air quality permit is needed.

Climate

The precipitation average is approximately 17.39 inches per year and the average yearly temperature is 42.3°F. March through September are the months which provide the greatest amounts of precipitation. The climate data is from the nearest weather station located at Virginia City.

Unique, Endangered, Fragile, or Limited Environmental Resources

No unique, endangered, fragile, or limited environmental resources have been identified as being impacted by the project.

Biological Environment

The wildlife observed at the site are typical of small drainages in Western Montana.

Mule deer are frequently observed at the site. They frequent both the bottomland and the sagebrush/grassland hillsides. Beds are frequently observed in the bushes and trees which are in the bottomland.

Numerous birds are observed in the area including: wrens, swallows, mountain bluebirds, killdeer and spotted sandpiper. The larger trees upstream from the mine site may provide nest sites for owls and for hawks, with the open sagebrush/grassland hillsides and marshy streambank habitats providing hunting areas.

Frogs and garter snakes are present in the moist areas. No fish have been observed in the creek. There is no sign of any beaver activity.

An occasional coyote and bear may cross the site, but no indication of either animal has been observed.

Human Environment

Montana Minerals intends to use local labor once the equipment is set up. A temporary out-of-state crew will be brought in initially to set up the equipment. Approximately 10-20 local people will be employed by the operation. There will be a minimal effect on the social environment as the employees are already citizens of the area.

One benefit will be the increased tax base to Madison County.

The cultural/historic resources of resources are identified in Exhibit 1.

Demands on Environmental Resources

1. Lands - minimal effect on soils, vegetation, agriculture as a result of the small area being mined and the proposed reclamation plan.

2. Water - minimal effect on the water resources of the area. All water will either report to the settling pond, be recycled or transported around the area in the McGovern Ditch and/or irrigation pipeline. Cal Creek will be provided the needed water for irrigation without any interruptions.

3. Air - minimal effect due to the mining method being employed. The wet process of gravel washing will suppress dust emissions.

4. Energy - the operation will require little power from Montana Power.

Environmental Impact Statement Conclusion

Based on the Preliminary Environmental Review and consultation with the Water Quality Bureau, Air Quality Bureau, Department of Fish, Wildlife and Parks, and the Department of State Lands personnel, no significant unavoidable impact is identified. Therefore, preparation of an EIS is not warranted at this level of proposed activity.

EXHIBIT 1 ARCHAEOLOGY

MONTANA HISTORICAL SOCIETY

HISTORIC PRESERVATION OFFICE

225 NORTH ROBERTS STREET • (406) 449-4584 • HELENA, MONTANA 59601

June 5, 1981

Mr. Jerry R. Burke
Opencut Bureau
Reclamation Division
Department of State Lands
1625 Eleventh Avenue
Helena, MT 59620

Dear Jerry:

Re: Cultural resource file search,
3T Corp., Placer Mine, Section
16, 21, 28, T6S, R3W, Madison County.

We have completed a cultural resource file search for the above-mentioned area. There are several historic sites in the area and in the surrounding vicinity which are listed in the Montana Historic Preservation Plan published by Fish and Game in 1975. The sites in your area of interest are: Virginia City Historic District (National Historic Landmark) Nevada City Historic District, and Summit-Union City Historic District (located near Virginia City).

No archaeological sites have been previously reported in your sections of interest, but several are reported in adjacent sections. I know of no professional surveys which would have included the area you are interested in so this result is not surprising.

Because this area is extremely rich in heritage resources, and because the probability of locating additional sites is very high, I strongly recommend that an on-the-ground cultural resource inventory be conducted prior to initiating project activities.

If you require further information on the aforementioned historic properties, please contact our office.

Sincerely,

Marcella Sherfy
Deputy SHPO

SAS/MS/det

MONTANA HISTORICAL SOCIETY

HISTORIC PRESERVATION OFFICE

225 NORTH ROBERTS STREET • (406) 449-4584 • HELENA, MONTANA 59601

July 7, 1981

Mr. Jerry Burke
Reclamation Division
State Lands
Helena, MT 59620

Dear Jerry:

On June 17, 1981 Patricia Bick, Architectural Historian, State Historic Preservation Office and Sara Scott, Staff Archaeologist, also of the SHPO office conducted a cultural resource inventory of approximately 30 acres in the Browns Gulch area located in T6S, R3W, sections 21 and 28. The survey was prompted by a request from the Reclamation Division of State Lands, which was reviewing a placer mining project proposal in this area and thought there might be significant resources in the area. The State Historic Preservation Office did the survey as part of other State travel. Placer mining activity has already commenced in the northern most portion of the project area for an approximate distance of 1,000 feet.

Vegetation in Browns Gulch proper is fairly dense in many areas, and is characterized by large cottonwoods and low lying shrubs. Slopes adjacent to the Gulch are relatively free of vegetation and are characterized by sage brush, wild rose and several species of wildflowers. In general, ground visibility was good throughout the project area.

We began our inventory in the southern portion of the project area and proceeded northward, covering both the Gulch bottom and the adjacent side slopes. Three historic properties were located during our inventory. Two of these properties are outside of the project area while one is in the immediate area of impact. The one site in the project area is located in the SW¼ of the SW¼ of section 28. It consists of the remains of a historic habitation, which is evidenced by the remains of two foundations and an intact root cellar. This habitation is most likely associated with mining activities which have occurred in this area since 1863 when gold was discovered in Alder Gulch. The site is significantly changed, as only one of the three original structures is still intact. Because of deterioration and disturbance that have occurred, much of the original integrity of this site has been lost. Based on these considerations we do not believe it is likely that this site would qualify for listing on the National Register.

The two historic properties outside of the project area consist of a mine shaft and a powder house. Because the mine shaft is well outside of the project area only locational date on the site was recorded. The powder house, located in SE¼ of the NW¼ of section 21, lies immediately adjacent to the area that has already been placer mined. This structure is extremely well preserved and was used to store explosives, employed in mining activities.

We spoke with John Ellingsin of Nevada City about the Brown's Gulch powder house and learned that this building may have been the outlet for explosives distributed by one of the larger supply houses in Virginia City - Ellings & Knight or S.R. Buford - and likely dates from the early 1870's. Buildings to store the explosives used in hard rock mining operations were usually constructed a good distance beyond the town limits as a safety precaution. The exterior walls of the powder house are of uncoursed rubblestone, measuring 18 inches in width. Three inch diameter ventilation holes were placed at the floor level in each of the stone walls. There are no windows in this structure and the centrally placed door is of heavy plate iron riveted construction with a locking latch. Although the wood planking of the gable roof is badly deteriorated, the boards are attached with round nails indicating that the roof may be of more recent origin than the building itself. The interior and exterior walls appear to have been remortared and the interior floor boards and ceiling joists appear to have been replaced relatively recently. A hole to accomodate a stove pipe was cut in the NW corner of the roof, indicating that the structure may have later been used as a shelter. The nature of the structure and its apparent use over time has allowed for excellent preservation. It is our judgment that the powder house at Brown's Gulch may be eligible for listing in the National Register under criteria A and C as established in 36CFR1202 due to its association with early mining activities in Alder and Brown's Gulches and as an extremely well preserved example of a distinctive structural type and particular method of construction which was employed for a designated purpose.

If any further disturbance is planned within the vicinity of this site, we recommend that a determination of eligibility be sought from the Keeper of the National Register.

In conclusion, it does not appear that any sites eligible or listed on the National Register will be effected by the proposed undertaking. If project boundaries be modified in any way, these recommendations are subject to change.

We will be forwarding site forms to you shortly.

Thank you for consulting with our office on this matter.

Sincerely,

Marcella Sherfy
Deputy SHPO

STATEWIDE ARCHAEOLOGICAL SURVEY
UNIVERSITY OF MONTANA

1. County Madison 2. Map Virginia City Quad 3. Site No. 24MA254

4. Twp. 6S. Range 3W. ; SE ¼ of NW ¼ of Sec. 21 5. Contour Elevation

6. Location and Aceess Head south on Hwy. 34 to Virginia City, Mt., 1½ miles before reaching Virginia City there is adirt road which goes off to the right, turn right on this road and proceed for approximately 1 mile or until reaching placer mining operation. Site is visible from the road on the east side and is approximately 100 feet to the east of the road.

7. Type of Site Historic Structure/Powder House

8. Description of Site Site consists of a very well preserved single stone building. This building may have been the outlet for explosives distributed by one of the larger supply houses in Virginia City- Ellings & Knight or S.R. Buford- and likely dates from the early 1870's. Buildings to store the explosives used in hard rock mining operations were usually constructed a good distance beyond the town limits as a safety precaution. The exterior walls of the powder house are of uncoursed rubblestone, measuring 18" in width. Three inch diameter ventilation holes were placed at the floor level in each of the stone walls. There are no windows in this structure and the centrally placed door is of heavy plate iron riveted construction with a locking latch. Although the wood planking o the gable roof is badly deteriorated, the boards are attached with round nails indicatin that the roof may be of more recent origin than the building itself. The interior and

9. Previous Designations 10. Published References

11. Owner ~~State Lands~~ Carl Creek(GB) 12. Address 13. Present Tenant

14. Site Area 12' 6" E-W by 18' 6" N-S 15. Est. Depth surface

16. Vegetation sage brush, wildflowers

17. Nearest Water Browns Gulch, approximately 100' east.

18. Possibility of Destruction Great, mining activity has already occured very nearby

19. Recommendations Site appears to be eligible for National Register under criteria A and C in 36CRF63.

20. Artifacts Collected

21. Artifacts Observed

22. Foto Numbers PB01EW1 1-3

Recorded By Pat Rick and Sara Scott June 17, 1991

8. exterior walls appear to have been remortared and the interior floor boards and ceiling joists appear to have been replaced relatively recently. A hole to accomodate a stove pipe was cut in the NW corner of the roof, indicating that the structure may have later been used as a shelter. The nature of the structure and and its apparent use over time has allowed for excellent preservation. The measurements for the structure are provided in no. 14 of the site form. Additionally, the door measures 3' 6" in width and 6' 5" in length.

STATEWIDE ARCHAEOLOGICAL SURVEY

UNIVERSITY OF MONTANA

1. County Madison 2. Map Virginia City Quad 3. Site No. 24MA253

4. Twp. 6S. Range 3W. ; SW ¼ of SW ¼ of Sec. 28 5. Contour Elevation

6. Location and Access Heading south on Hwy. 34 to Virginia City there is a dirt road to the right approximately 1½ miles north of Virginia City. Turn right on this road, which follows Browns Gulch on the west side, and proceed for approximately 2 miles. The site is immediately adjacent to the dirt road on the west side.

7. Type of Site Historic Occupation/Mining

8. Description of Site The site consists of the remains of an historic habitation, which is evidenced by the remains of two foundations (most likely a cabin and an outhouse) and an intact root cellar. This habitation is most likely associated with mining activities which have occured extensively in this area since 1863 when gold was discovered in Alder Gulch. The site maintains little of its original integrity as only 1 of 3 original structures is still intact. Pieces of rubber and sheets of metal are scattered around the site.

9. Previous Designations 10. Published References

11. Owner ~~State lands~~ BLM (DS) 12. Address 13. Present Tenant

14. Site Area 75 feet N-S by 50 feet E-W. 15. Est. Depth surface

16. Vegetation sage brush, wildrose and several species of wildflowers

17. Nearest Water Browns Gulch, 50 feet to the east

18. Possibility of Destruction Great if road work or mining activity occurs in this area.

19. Recommendations Site is ineligible for National Register listing because of its loss of integrity and deteriorated nature.

20. Artifacts Collected

21. Artifacts Observed pieces of rubber and sheets of metal

22. Foto Numbers none taken

23. Recorded By Sara Scott and Pat Bick 24. Date June 17, 1991

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Brown's Gulch - Virginia City

EXHIBIT 2 SOILS

60E

RECEIVED MAY 19 1981 STATE LANDS

$T1060E$Shurley-Rentsac, cool-Rock outcrop complex, 3 to 35 percent slopes.

$T1This map unit is on foot slopes, mountainsides, and hills in the foothills part of the Ruby Valley. The Rentsac soil has bedrock at a depth of 4 to 20 inches. Slopes are mainly less than 250 feet long. Elevation is 4,500 to 6,500 feet. The average annual precipitation is about 12 inches, the average annual air temperature is about 40 degrees F, and the average frost-free season is about 100 days.

$I01This unit is about 35 percent Shurley very flaggy coarse sandy loam, 35 percent Rentsac channery sandy loam, and 20 percent Rock outcrop. Rock outcrop is mainly on slope breaks and on ridgetops; the Rentsac soils are adjacent to the Rock outcrop; and the Shurley soils are on slopes.

$I01Included in this unit is about 10 percent Nuley soils. They are in the less sloping areas of the unit. This soil does not adversely affect the use and management of this unit for rangeland.

$I01The Shurley soil is deep and well drained. It formed in colluvium derived from gneiss, schist, and granite. Typically, the surface layer is grayish brown very flaggy coarse sandy loam 4 inches thick. The subsoil is pale brown very flaggy coarse sandy loam 6 inches thick. The substratum to a depth of 60 inches is light gray and very pale brown very flaggy loamy sand.

$IO1Permeability is moderately rapid to a depth of 10 inches and rapid below this depth. Available water capacity is about 2 inches. Effective rooting depth is 60 inches or more. Where this soil is under native vegetation, the average annual wetting depth is about 30 inches. Runoff is medium to rapid, and the hazard of water erosion is moderate to high. The hazard of soil blowing is slight. Very flaggy loamy coarse sand is at a depth of 8 to 25 inches.

$IO1The Rentsac soil is shallow and well drained. It formed in material derived from gneiss and schist. Typically, the surface layer is grayish brown channery sandy loam 4 inches thick. The underlying material to a depth of 12 inches is light brownish gray very channery sandy loam. Below this is gneiss and schist.

$IO1Permeability is moderately rapid, and available water capacity is about 1 inch. Effective rooting depth is 4 to 20 inches. Where this soil is under native vegetation, the average annual wetting depth is about 16 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is moderate. Bedrock is at a depth of 4 to 20 inches.

$IO1The Rock outcrop is hard gneiss and schist and granite.

$IO1This unit is used for rangeland. It is not suited to cultivated crops because of the shallow depth of the soils, the content of coarse fragments, droughtiness, and slope.

$I01$T3Range management.¢$T1 The potential native plant community on the Shurley soil is mainly bluebunch wheatgrass, prairie sandreed, Indian ricegrass, needleandthread, and basin wildrye. If the range is excessively grazed by cattle, the proportion of bluebunch wheatgrass, prairie sandreed, basin wildrye, curlleaf mountainmahogany, and Indian ricegrass decreases and the proportion of needleandthread, sand dropseed, and prairie junegrass increases. If excessive grazing continues, plants such as fringed sagewort, broom snakeweed, rubber rabbitbrush, and annual bromes may invade. The potential native plant community produces about 2,300 pounds per acre of air-dry vegetation in years of above-normal precipitation and 1,100 pounds in years of below-normal precipitation.

$I01The potential native plant community on the Rentsac soil is mainly bluebunch wheatgrass and needleandthread. If the range is excessively grazed by cattle, the proportion of bluebunch wheatgrass decreases and the proportion of needleandthread, Sandberg bluegrass, blue grama, and threadleaf sedge increases. If excessive grazing continues, plants such as annual bromes, fringed sagewort, rubber rabbitbrush, and broom snakeweed may invade. The potential native plant community produces about 1,200 pounds per acre of air-dry vegetation in years of above-normal precipitation and 600 pounds in years of below-normal precipitation.

$I01Rock outcrop supports little if any vegetation, but shrubs grow in the fractures in the rock.

$IO1Use of mechanical treatment practices is not practical. Steepness of slopes and areas of Rock outcrop limit access by livestock. The surface layer is susceptible to water erosion and soil blowing if it is disturbed or the range is overgrazed.

$IO1$T3Windbreak management.¢$T1 This unit is not suited to windbreaks because of the areas of Rock outcrop, the shallow depth of the soils, the content of coarse fragments, droughtiness, and slope.

$IO1$T3Homesite development.¢$T1This unit is poorly suited to homesite development because of the steepness of slope and the shallow depth to bedrock of the Rentsac soil.

$IO1This map unit is in capability subclass VIe, nonirrigated. The Shurley soil is in Sands range site, 10- to 14-inch precipitation zone, and the Rentsac soil is in Shallow range site, 10- to 14-inch precipitation zone.

BY .....DATE ..... SUBJECT ..... SHEET NO. ..... OF.....

CHKD. BY .....DATE .... JOB NO. .....

.....

EXHIBIT 3 SCHEMATIC DRAINAGE PLAN

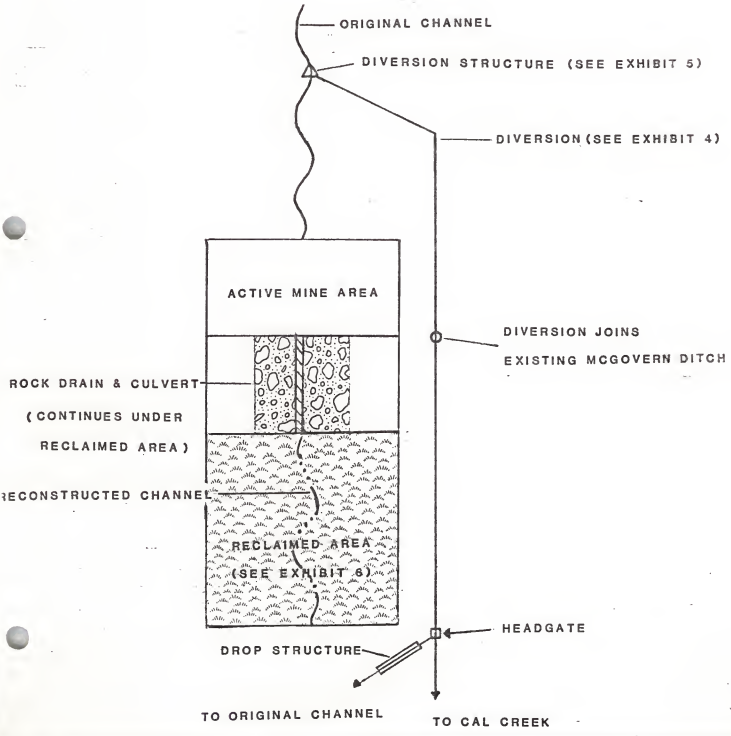


EXHIBIT 4 DIVERSION DITCH DESIGN

V = 1.3F/S FOR 10CFS WITH A SLOPE OF 0.1'/100'

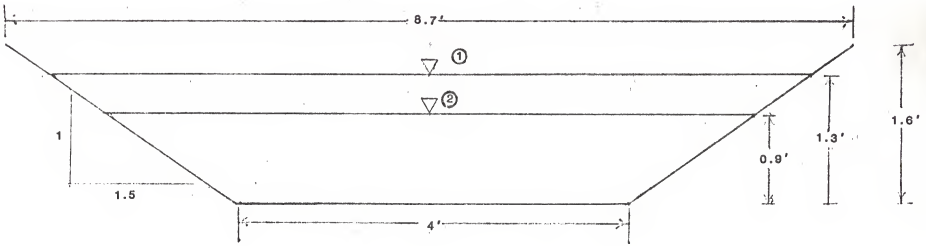
① 10CFS = 400 MINERS INCHES

② 5CFS = 200 MINERS INCHES

TOP WIDTH = 8.7'

BOTTOM WIDTH = 4'

TOTAL DEPTH = 1.6' (0.3'F.B.)



SHEET NO. ..... OF. .....
JOB NO. .....

SUBJECT .....

BY ..... DATE .....
CHKD. BY ..... DATE .....

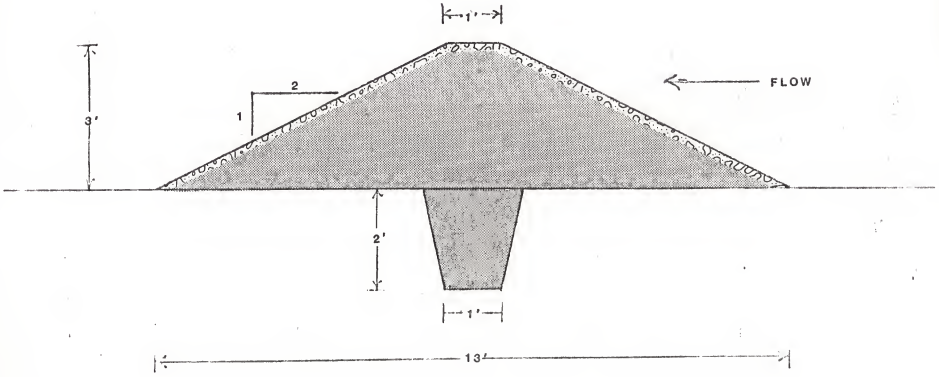
EXHIBIT 5 DIVERSION STRUCTURE

NOTE:

1)CORE CONSISTS OF COMPRESSED EARTH.

2)ALL FACES TO BE COVERED WITH 1' DIAMETER RIP-RAP.

3)DIMENSIONS WILL VARY WITH EXACT LOCATION.



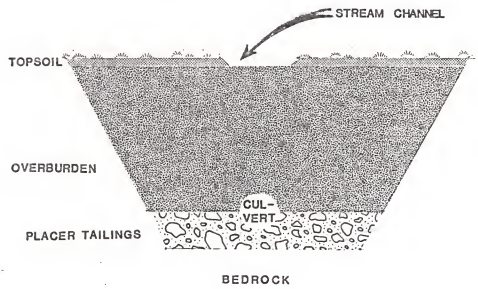
SHEET NO. ..... OF .....
JOB NO. .....
SUBJECT .....
BY ..... DATE .....
CHKD. BY' ..... DATE .....

BY .....DATE ..... SUBJECT ..... SHEET NO. ..... OF.....

CHKD. BY .....DATE .... JOB NO. .....

EXHIBIT 6 CROSS-SECTION OF RECLAIMED LAND

(NO SCALE)



DEPARTMENT OF STATE LANDS

TED SCHWINDEN, GOVERNOR

CAPITOL STATION

STATE OF MONTANA

(406) 449-2074
(406) 449-4560 RECLAMATION DIVISION

1625 ELEVENTH AVENUE
HELENA, MONTANA 59620

(406) 449-2711 EIS TEAM

1539 ELEVENTH AVENUE
HELENA, MONTANA 59620

MEMORANDUM

TO: Jerry Burke

FROM: Pat Driscoll PD

RE: Air Quality Requirements for Montana Minerals

DATE: May 9, 1983

The following is an emission inventory for the Montana Minerals placer mining operation at Brown's Gulch based on the estimated operational data available.

Overburden	-	58,608 yd^3
Gravel	-	7,326 yd^3
Total		65,934 yd^3

65,934 yd^3/yr x 2.2 tons/ton x 1 ton/1.5 yd^3 x 1 ton/2000 lb = 6.5 ton/yr

Emission factor of 0.2 lb./ton includes 0.1 lb./ton for material handling and 0.1 lb./ton for conveying.

Exposed or Disturbed Acreage (Wind Erosion)

$$23 \text{ Acres} \times \frac{1{,}200 \text{ lb.}}{\text{Acre}} = \frac{13.8 \text{ ton}}{\text{Year}}$$

$$\text{Total Particulate Emissions} = \frac{18.2 \text{ ton}}{\text{Year}}$$

An air quality permit is required for any source which has the potential to emit 25 tons/year of any pollutant. Since Montana Minerals' estimated particulate emissions are 18.2 tons/year, an air quality permit is not required.

sg

AN EQUAL OPPORTUNITY EMPLOYER